Accelerating the engineering of biological systems through foundational technologies and AI

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Abstract

The engineering of biological systems has the capability to address some of our most pressing global challenges in a sustainable manner. Biology has emerged as a data rich discipline, through Genomics and Systems Biology, which has transformed our understanding of biology, while Synthetic Biology has provided a toolbox for the engineering of new biological systems. Approaches that facilitate our capability in navigating the complexity involved in engineering biological systems will further enhance our ability to accelerate bioscience discovery and application. Now that the core tools of synthetic biology have been developed, we require a change in scale to fully capitalise on the opportunities. In this talk I will highlight some of the advances that have enabled us to rapidly prototype new biological designs with the development of automated workflows and address the challenges that we now face in developing appropriate analysis methodologies. The integration of the conceptual design landscape with the learning framework is key to enabling closed loop learning. Future developments will require data-driven biological engineering and the next logical but transformative development is to embed data science approaches to facilitate 'intelligent' machine learning.

Keywords: Engineering Biological Systems, machine learning, automated workflows

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